Effect of salt concentrations on the growth of heat-stressed and unstressed Escherichia coli.

ABSTRACT

The effect sodium chloride (NaCl) and potassium chloride (KCl) concentration on the growth of Escherichia coli cells cultivated at 37 and 44°C was studied in an effort to understand the importance of the salts and glucose in medium to the growth of E. coli. A turbidimetric method was used to measure the growth of E. coli after a 24 hours incubation period. The turbidimetric method used gave a high correlation (R2 = 0.9606) with the traditional surface colony count method. Four sets of salt concentrations, 0, 0.5, 1.0 and 1.5% (w/v), were employed throughout this study. Absence of NaCl in the medium was found to slightly decrease the growth of E. coli at 37°C. E. coli grew optimally at 0.5% (w/v) NaCl concentration. Addition of 0.5% KCl was found to have less beneficial effect on the growth of E. coli at 37°C compared to cells grown in medium with 0.5% NaCl. Increase in the concentrations of both salts above 0.5% decreased growth at 37°C. The extent to which growth was suppressed was directly proportional to the concentration of salts. At zero concentration of both salts, growth of E. coli was very low at 44°C. Increase in the concentrations of both NaCl and KCl from 0.5% to 1.5% resulted in growth enhancement. Glucose affected significantly the growth of E. coli at 37°C. Addition of 140 mM (w/ v) of glucose to the medium increased the growth of E. coli at 37°C to a greater extent than was obtained by salt addition. However, the addition of the same concentration of glucose was found to have only a very slight effect on growth at 44°C.

Keyword: Heat-stressed Escherichia coli; Salt concentration; Growth.